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SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING AUGUST 1936

By IRVING F. HAND, *Assistant in Solar Radiation Investigations*

For a description of instruments employed and their exposures, the reader is referred to the January 1935 REVIEW, page 24.

Table 1 shows that solar radiation intensities averaged below normal at all three Weather Bureau stations. Considerable haze, dust, and smoke were reported from both Madison and Lincoln.

Table 2 shows an excess in the amount of total solar and sky radiation received on a horizontal surface at all stations except Miami, Riverside, Blue Hill, and Ithaca.

The solar work at Pittsburgh was permanently discontinued during the month.

Polarization observations made at Washington on 4 days give a mean of 58 percent with a maximum of 61 percent on the 31st. At Madison, observations on 2 days give a mean of 44 percent with the higher value of 57 percent on the 24th. All of these values are below the corresponding August normals.

TABLE 1.—*Solar radiation intensities during August 1936*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

TABLE 1.—*Solar radiation intensities during August 1936—Contd.*
MADISON, WIS.

Date	Sun's zenith distance										Local mean solar time	
	Air mass											
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		
75th mer. time	e	5.0	4.0	3.0	2.0	1 1.0	2.0	3.0	4.0	5.0	e	
	mm.	cal.	mm.									
Aug. 1.....	8.81	0.44	0.58	0.70	0.88	1.27					10.21	
Aug. 3.....	14.10	.50	.63								14.60	
Aug. 5.....	8.91	.42	.57	.78	1.22						9.14	
Aug. 7.....	16.20					1.12					17.37	
Aug. 15.....	15.65					1.33					17.37	
Aug. 24.....	(.47)	.54	.75	.93	1.24							
Means.....												
Departures.....	-24	-27	-22	-16								

LINCOLN, NEBR.

Aug. 5.....	12.68									0.54	0.42	0.31
Aug. 8.....	14.10	0.49	0.65	0.89	1.28					.72	.55	.46
Aug. 12.....	11.81					1.01	1.27	0.95				15.11
Aug. 13.....	11.81									.98	.65	.45
Aug. 14.....	15.65									.91	.73	.60
Aug. 17.....	14.10	0.58	.69	.83	1.04	1.25	1.02	1.02		.85	.68	.58
Aug. 18.....	10.97	.71	.82	.97	1.15	1.31						11.38
Means.....	(.64)	.67	.81	1.02	1.28	1.07				.89	.75	.64
Departures.....	-04	-11	-10	-07						-.11	-.19	-.18

BLUE HILL OBSERVATORY OF HARVARD UNIVERSITY

Aug. 1.....	10.7						1.08	1.23	1.05			
Aug. 3.....	12.3						.84	.96				
Aug. 5.....	10.3									1.20		
Aug. 7.....	11.5									1.23		
Aug. 8.....	9.9						.91	1.24				
Aug. 9.....	12.3						0.96	1.08	1.28	1.08		
Aug. 10.....	11.9									1.21		
Aug. 12.....	15.3									1.09	.61	
Aug. 13.....	14.3									.99		
Aug. 14.....	14.7									.75		
Aug. 16.....	12.5									.56	.92	
Aug. 18.....	9.9						0.64	.82	1.05	1.07		
Aug. 19.....	13.7									.56	1.18	
Aug. 20.....	18.2									1.14	.90	
Aug. 24.....	17.5									1.19	1.33	1.12
Aug. 25.....	13.7									1.21	1.34	1.24
Aug. 26.....	9.9									1.20	1.32	1.22
Aug. 27.....	9.9									1.20	1.30	1.28
Aug. 28.....	9.2									1.01	1.23	1.30
Aug. 30.....	11.9											1.30
Aug. 31.....	10.3											1.34
Means.....							(.62)	.82	.96	1.19	1.07	1.06
Departures.....	+.27	+.17	-.05	-.05								(.66)

¹ Extrapolated.

TABLE 3.—Total, I_m , and screened, I_v , I_r , solar radiation intensity measurements, obtained during August 1936 and determinations of the atmospheric turbidity factor, β , and water-vapor content, w —depth in millimeters, if precipitated—Continued

BLUE HILL OBSERVATORY OF HARVARD UNIVERSITY—Continued

Date and hour angle	Solar altitude	Air mass	I_m	I_v	I_r	β_{I_m-r}	β_{I_v-r}	β_{mean}	$\frac{I_{w=0}}{1.94}$	$\frac{I_{v=0}-I_m}{1.94}$	w	Air-mass type
									Percentage of solar constant			
Aug. 13												
2:09 a. m.	52° 28'	m 1.27	gr. cal. 0.980	gr. cal. 0.693	gr. cal. 0.577							mm
0:13 a. m.	62° 15'	1.13	.977	.673	.561							
Aug. 14												
2:52 a. m.	43° 59'	1.44	.720	.529	.455							T _M
2:32 a. m.	47° 10'	1.37	.751	.556	.470							
0:34 p. m.	61° 20'	1.14	.727	.550	.461							
1:00 p. m.	39° 28'	1.16	.623	.461	.407							
3:35 p. m.	36° 58'	1.68	.395	.315	.295							
Aug. 16												
4:35 a. m.	25° 05'	2.35	.498	.367	.338							T _M
3:22 a. m.	38° 14'	1.61	.646	.464	.384							
Aug. 18												
5:22 a. m.	15° 50'	3.63	.695	.524	.467	0.134	0.177	0.156	39.5	3.3		N _{ro}
4:10 a. m.	29° 08'	2.06	1.026	.707	.591	.100	.096	.098	63.6	10.1	7.1	
3:32 a. m.	36° 00'	1.70	1.140	.760	.629	.080	.148	.114	65.8	6.4	5.0	
1:27 a. m.	55° 27'	1.21	1.300	.840	.676	.057	.123	.090	75.2	7.4	6.7	
0:10 a. m.	60° 57'	1.14	1.326	.857	.682	.049	.100	.074	78.2	9.1	8.6	
0:15 p. m.	60° 41'	1.14	1.322	.851	.684	.053	.125	.089	77.8	8.9	8.3	
1:05 p. m.	51° 48'	1.18	1.307	.849	.673	.058	.096	.077	74.9	6.8	6.3	
3:52 p. m.	32° 25'	1.92	1.075	.726	.583	.069	.053	.061	72.1	16.1	11.8	
Aug. 19												
4:38 a. m.	23° 44'	2.43	.834	.583	.490	.115	.151	.133	53.8	10.3	6.6	N _{ro}
4:13 a. m.	25° 21'	2.33	.934	.645	.525	.085	.114	.100	56.0	7.3	4.8	
Aug. 20												
2:42 p. m.	44° 08'	1.46	1.020	.704	.576	.169	.178	.174	61.8	8.8	7.3	N _{ro} →T _M
3:15 p. m.	38° 34'	1.60	1.004	.688	.540	.115	.137	.126	67.2	14.2	11.2	
4:28 p. m.	25° 30'	2.32	.840	.600	.452	.090	.062	.076	65.3	21.2	14.0	
Aug. 24												
2:27 a. m.	45° 32'	1.40	1.303	.852	.679	.054	.075	.060	79.6	10.9	9.3	T _M
2:00 a. m.	49° 28'	1.31	1.323	.886	.699	.046	.082	.084	78.2	8.4	7.4	
0:10 a. m.	58° 58'	1.17	1.338	.887	.696	.063	.100	.092	78.1	7.5	7.0	N _{ro} →T _M
2:02 p. m.	49° 12'	1.32	1.280	.829	.665	.059	.105	.082	76.8	8.7	7.6	
2:45 p. m.	42° 37'	1.43	1.225	.799	.652	.068	.106	.087	76.8	12.3	10.2	
3:02 p. m.	39° 48'	1.56	1.221	.794	.648	.067	.079	.073	74.4	10.1	8.2	
5:24 p. m.	14° 10'	4.02	.817	.597	.480	.050	.056	.053	58.3	15.2	6.0	
Aug. 25												
5:22 a. m.	14° 19'	3.99	.586	.444	.383	.068	.139	.104	47.2	6.3	3.2	N _{ro} →T _M
2:09 a. m.	47° 55'	1.34	1.133	.751	.617	.117	.158	.138	66.1	6.5	5.6	
1:54 a. m.	50° 01'	1.30	1.137	.762	.613	.117	.150	.134	69.4	9.6	8.5	
Aug. 26												
0:19 a. m.	58° 04'	1.18	1.367	.883	.714	.043	.107	.075	77.4	5.7	4.3	N _{ro}
0:54 p. m.	56° 04'	1.20	1.379	.900	.724	.049	.093	.071	76.6	4.0	4.7	
1:08 p. m.	55° 04'	1.22	1.370	.900	.722	.045	.085	.065	78.3	5.7	5.2	
2:49 p. m.	41° 31'	1.50	1.302	.858	.686	.042	.072	.057	77.8	9.2	7.6	
4:52 p. m.	19° 39'	2.98	1.049	.728	.590	.038	.057	.048	66.6	11.3	6.6	
Aug. 27												
3:04 a. m.	38° 41'	1.60	1.299	.857	.681	.035	.057	.046	77.9	9.5	7.5	N _{ro}
0:58 a. m.	55° 44'	1.21	1.375	.886	.707	.035	.081	.068	78.2	5.4	5.0	
0:36 a. m.	57° 03'	1.19	1.398	.901	.716	.032	.071	.052	80.6	7.1	5.6	
0:03 p. m.	58° 00'	1.18	1.383	.895	.705	.033	.060	.046	83.0	10.3	9.6	
4:50 p. m.	19° 46'	2.93	.989	.684	.552	.045	.064	.054	61.8	9.8	5.8	
Aug. 28												
4:52 a. m.	19° 11'	3.02	1.076	.763	.630	.044	.063	.054	64.6	8.0	4.7	N _{ro}
3:53 a. m.	29° 56'	2.00	1.231	.829	.671	.045	.069	.057	72.3	7.6	4.6	
3:02 a. m.	38° 50'	1.59	1.278	.848	.679	.045	.072	.058	75.4	8.2	5.9	
1:35 p. m.	51° 39'	1.27	1.296	.855	.686	.068	.098	.083	75.3	7.2	6.5	
1:56 p. m.	48° 52'	1.32	1.288	.855	.686	.050	.098	.074	76.6	8.9	7.8	
Aug. 30												
4:34 p. m.	21° 48'	2.68	.919	.637	.516	.062	.058	.060	65.9	17.6	10.1	N _{ro}
5:46 p. m.	10° 02'	5.58	.661	.500	.434	.075	.100	.088	45.4	11.2	4.8	
Aug. 31												
2:35 a. m.	51° 43'	1.29	1.107	.762	.614	.101	.151	.126	67.8	7.6	6.2	N _{ro}
2:17 p. m.	52° 32'	1.25	1.290	.864	.688	.091	.140	.116	72.4	4.7	4.2	

